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Attila Bicsak

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EXAMINER

INGBERG, TODD D

ART UNIT

PAPER NUMBER

2193

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/651,839

Applicant(s)

BICSAK ET AL.

Examiner

Todd Ingberg

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2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/4/04, 2/4/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

Claims 1 – 14 have been examined.

### *Drawings*

1. The drawings filed August 29, 2003 are objected to for the following reasons.

Figure 8 is not in sequence.

Figures 2, 3, 4, 5, 6A – 6F have a font too small for patent literature.

### *Specification*

2. The attempt to incorporate subject matter into this application by reference on page 20 is ineffective. The page should be deleted and URL are not allowed in Patent literature.

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. Legal words like method and system should be removed.

### *Information Disclosure Statement*

4. The Information disclosure Statements filed February 4, 2004 and February 4, 2005 have been considered.

### *Claim Rejections - 35 USC § 112*

5. Claims 3 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

#### **Claim 3**

The method of claim 2, wherein said optimisation technique is *substantially* at least one of the following: unreachable eliminator, branch unconditionalizer, simple redundant eliminator, redundant load eliminator, dead code eliminator, register liveness analyser, branch rationalizer.

Claim 10

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The method of claim 1, wherein said program is *substantially* ARM or THUMB architecture specific.

The purpose of this claims is unclear since *substantially* is not quantifiable. What substantially of a technique/ architecture means is not clear. No interpretation is able to provide. No prior art rejection is required for claim 10.

***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 – 14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The current focus of the Patent Office in regard to statutory inventions under 35 U.S.C. § 101 for method claims and claims that recite a judicial exception (software) is that the claimed invention recite a practical application. Practical application can be provided by a physical transformation or a useful, concrete and tangible result. No physical transformation is recited and additionally, the final result of the claim is optimization which is not a tangible result because the result is not clearly claimed to be tangibly embodied on a computer readable medium. The following link on the World Wide Web is for the United States Patent And Trademark Office (USPTO) policy on 35 U.S.C. §101.

[http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101\\_20051026.pdf](http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf)

Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are directed to a signal directly or indirectly by claiming a medium and the Specification recites evidence where the computer readable medium is define as a “*wave*” (such as a carrier wave). In that event, the claims are directed to a form of energy which at present the office feels does not fall into a category of invention.

The following link on the World Wide Web is for the United States Patent And Trademark Office (USPTO) policy on 35 U.S.C. §101.

[http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101\\_20051026.pdf](http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf)

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1 –3 and 5- 14 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN # 5,966,539 Srivastava filed November 3, 1997 and issued October 12, 1999.

#### **Claim 1**

**Srivastava** anticipates a method for constructing a control flow graph (CFG) (Srivastava, figure 8) from a computer executable program the instructions of which belong to one or more instruction sets (**Srivastava**, Figure 8, the CFG by definition), said method comprising the steps of defining a number of block leader types including at least one type related to an instruction set change, block leaders specifying basic block boundaries in the program (**Srivastava**, Col 5, lines 5 - 20), said basic blocks including instructions or data (702) (**Srivastava**, Col 3, lines 5 – 15), building a CFG structure comprising basic blocks found in the program (708) (**Srivastava**, Figure 8, the CFG by definition),

adding control flow and addressing information to said CFG by propagating through said basic blocks and internals thereof (710) (**Srivastava**, Col 3, lines 5-15, dead code elimination).

**Note:** instructions sets in the broadest reasonable interpretation is met by the multiple source code files and object files in Figure 2.

#### **Claim 2**

The method of claim 1, further comprising a step wherein said CFG is compacted by utilizing a CFG optimisation technique (712). As per claim 1 – Dead code elimination compacts the CFG.

#### **Claim 3**

The method of claim 2, wherein said optimisation technique is substantially **at least one of** the following: unreachable eliminator, branch unconditionalizer, simple redundant eliminator, redundant load eliminator, **dead code eliminator** (As per claim 1 – Dead code elimination), register liveness analyser, branch rationalizer.

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**Claim 5**

The method of claim 1, wherein the step of adding control flow and addressing information (710) includes propagation of basic block emulation results from a block to another. (**Srivastava**, Col 13, lines 13-24).

**Claim 6**

The method of claim 1, wherein said block leader types further include an entry for at least one of the following: data symbols intermixed with instructions, program entry point, exception vector, relocation entry point, relocation target point, successor of a branch instruction, target of a branch instruction, function (**Srivastava**, Figures 3 and 4).

**Claim 7**

The method of claim 1, wherein the CFG comprises hierarchical levels of sections, functions and basic blocks. (**Srivastava**, Figure 8, the CFG by definition).

**Claim 8**

The method of claim 1, further comprising the step of reading data from a binary executable file (704). **Srivastava** is runtime optimization the executable files are inherently binary (Figure 2, #60, #50 and #60 prime)

**Claim 9**

The method of claim 1, further comprising the step of re-constructing an executable from said CFG (714). Inherent in run time optimization. The reference teaches a runtime executable being optimized which required the CFG being constructed. The reference also teaches different optimization techniques which alters the CFG. One of ordinary skill in the art should know the optimized runtime executable has a direct relationship to the CFG. See **Srivastava** Figure 2 #60 Prime which is the altered – optimized executable code.

**Claim 10**

The method of claim 1, wherein said program is substantially ARM or THUMB architecture specific. See rejection under 112 above.

**Claim 11**

A computer program comprising code for carrying out the steps of claim 1 for at least temporary storage in a computer readable medium. **Srivastava** Figure 2, #3 memory.

**Claim 12**

A carrier medium for storing a computer executable program for carrying out the steps of claim 1. See the rejection under 101 Signal above and **Srivastava** Figure 2, #3 memory.

**Claim 13**

**Srivastava** anticipates a system for constructing a control flow graph (CFG) from a computer executable program (as per claim 1) , said system comprising processing means (806)

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(Srivastava, Figure 2 #50 optimizer) and memory means (810) for processing and storing instructions and data (Srivastava, Figure 2 #3 memory and 60 prime the optimized code and figure 3, #52, RTL), and data transfer means (808) for accessing data (Srivastava, Figure 3, lines connecting #55, 56 or 57 to any of #101, 102, 103), said system arranged to define a number of block leader types including at least one type related to an instruction set change, block leaders specifying basic block boundaries in the program (as per claim 1), said basic blocks including instructions or data, said system further arranged to build a CFG structure comprising basic blocks found in the program (inherent relationship of the executable inherent in runtime optimization and the building of CFG as per claim 1), and to add control flow and addressing information (Srivastava, Figure 4 – flow control to produce figure 2, #60 prime) to said CFG by propagating through said basic blocks and internals thereof (Srivastava, Figure 2, 60 prime).

**Claim 14**

The system of claim 13, further arranged to compact the CFG by utilizing a CFG optimisation technique. As per the rejection for claim 2.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Srivastava, in view of Haber USPN #7036,116.

**Claim 4**

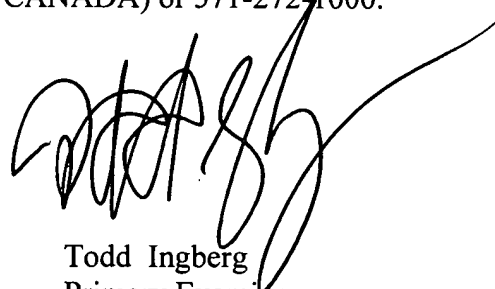
The method of claim 1, wherein the step of adding control flow and addressing information includes iterating through instructions of a single basic block at a time on the basis of constant propagation information associated with said block (Haber, col 4, lines 1 – 6). Both Srivastava and Haber teach runtime optimization. Haber teaches the copy propagation technique. Therefore, it would have been obvious to one of ordinary skill in the art to combine Srivastava and Haber, because, inlining functions makes programs more efficient.

***Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Todd Ingberg whose telephone number is (571) 272-3723. The examiner can normally be reached on during the work week..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Todd Ingberg', with a long, sweeping horizontal line extending to the right.

Todd Ingberg  
Primary Examiner  
Art Unit 2193